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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,640	03/28/2001	Atsushi Koike	35.C15222	2483

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EXAMINER	
FULLER, ERIC B	

ART UNIT	PAPER NUMBER
1762	

DATE MAILED: 02/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)	
09/818,640	KOIKE ET AL.	
Examiner	**Art Unit**	
Eric B Fuller	1762	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 November 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6,9-13 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,9-13 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 21, 2003 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 3-5, 11-13, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burger et al. (WO 98/58100).

Burger teaches a process of supplying a hydrogen gas and a raw material gas for forming a film that comprises at least an Si element (page 5, lines 23-30). High frequency electric power into the discharge electrode may create the plasma (page 3, lines 25-30). The substrate holder, which acts as an auxiliary electrode by producing a substrate bias, is supplied with a frequency that overlaps the applicant's claimed range

(page 8, lines 10-15). This auxiliary electrode (figure 1, reference 11) is placed in the vacuum chamber and makes contact with the bottom of the substrate. Since the plasma uniformly coats the substrate by ion bombardment (column 1, lines 60-65), the plasma must inherently contact the area in which the substrate holder holds the substrate. Taking this into consideration, the substrate holder (auxiliary electrode) reads on being "in plasma". Additionally, since Burger differentiates between the substrate holder (11) and the substrate (10), the substrate holder, which acts as the auxiliary electrode, reads on being separate from the substrate. The voltage may be pulsed unipolar or bipolar (page 8, lines 25-30). Depending on the polarity of the voltage, which the reference allows for either or both, the ions and/or electrons are excited in order to control the generation of hydrogen radicals and ion bombardment (paragraph bridging pages 10 and 11). The reference fails to teach the frequency of the high frequency electric power supplied to the discharge electrode. However, it is the position of the examiner that since the reference teaches to use a high frequency power source, to use frequencies within the applicant's broad range of 1MHz to 200MHz would have been obvious at the time the invention was made to a person having ordinary skill in the art with the expectation of success, as these values are considered to be high frequencies. Additionally, the reference fails to teach the maximum amplitude of the bias voltage.

However, the reference does teach that there is a cause and effect relationship between the magnitude of the voltage and the hardness of the deposited layer (page 14, lines 4-6). Therefore, it would have been obvious, and within the skill of one

practicing in the art, to use voltages that give the desired hardness of the deposited layer.

As to claim 27, the interpretation of the substrates being analogous to the auxiliary electrodes, reads on the limitation of this claim.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Burger et al. (WO 98/58100), as applied to claim1 above, and further in view of Tamura (JP 61-283127).

Burger teaches the limitations of claims 1, but is silent in using multiple electrodes. However, Tamura teaches that by using multiple electrodes that are independently controlled, plasma may be uniformly distributed, which results in better process efficiency (abstract). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use multiple electrodes in the process taught by Burger. By doing so, uniformity of the plasma is increased, resulting if a more efficient process.

Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Burger et al. (WO 98/58100), as applied to claim 1 above, and further in view of Raoux et al. (US 6,162,709).

Burger teaches the limitations of claim 1, as shown above, but fails to explicitly teach the shape of the electrode. However, Raoux teaches a process where a pulsed voltage bias is applied to a substrate by an electrode that is embedded in the substrate

holder and comprises a nickel rod that has a small diameter and a small area facing the substrate (column 8, lines 40-50). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the embedded electrode of Raoux in the process taught by Burger with the expectation of achieving similar results, as both reference act to supply a pulsed voltage bias to a substrate.

Response to Arguments

Applicant argues that Burger fails to teach the auxiliary electrode being separate from the substrate, as has been added by amendment. This is not found convincing. Burger differentiates between the substrate and the substrate holder; they are separate entities. The substrate holder reads on the auxiliary electrode. Thus, Burger differentiates between the substrate and the auxiliary electrode. The auxiliary electrode and the substrate are separate.

Applicant argues that Burger fails to explicitly teach that bias voltages above 80V may cause discharging. This is not found persuasive. The claims do not require such a limitation. The claims only read to use a maximum amplitude of 80V or less. Because of the cause and effect relationship taught above, it would have been obvious, and within the skill of one practicing in the art, to determine the voltage of the bias.

Applicant argues that the preferred range of biasing frequency taught by Burger is outside of the applicant's claimed range. This argument is not found convincing. Burger explicitly teaches to use frequencies that are in the applicant's range. Therefore, regardless of preference, the reference anticipates this limitation.

Applicant argues that using multiple electrodes results in unexpected results, as pertinent to claim 6. This is moot in view of the new grounds of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (571) 272-1420. The examiner can normally be reached on Mondays through Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck, can be reached at (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

EBF

TIMOTHY MEEKS
PRIMARY EXAMINER